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ABSTRACT

Florida's Statewide Assessment Program of the State Department of Education has been involved in a major effort to develop adequate strategies for releasing and publishing assessment scores for schools. One dimension of this effort has been the development of predicted or "adjusted" scores. These scores compare a school to other similar schools rather than simply to the state average. Using complex statistical techniques, the Florida Statewide Assessment Program developed and released predicted test scores for each school which participated in the 1974-75 assessment of communication skills and mathematics in grades 3, 6, and 9. The predicted scores were based on several factors which are related to achievement: Spanish native language, family income, white collar occupation, college education, and minority enrollment. This document is a guide to the predicted scores calculated from the 1975-76 assessment of communication skills and mathematics in grades 3 and 6. (Author/MV)

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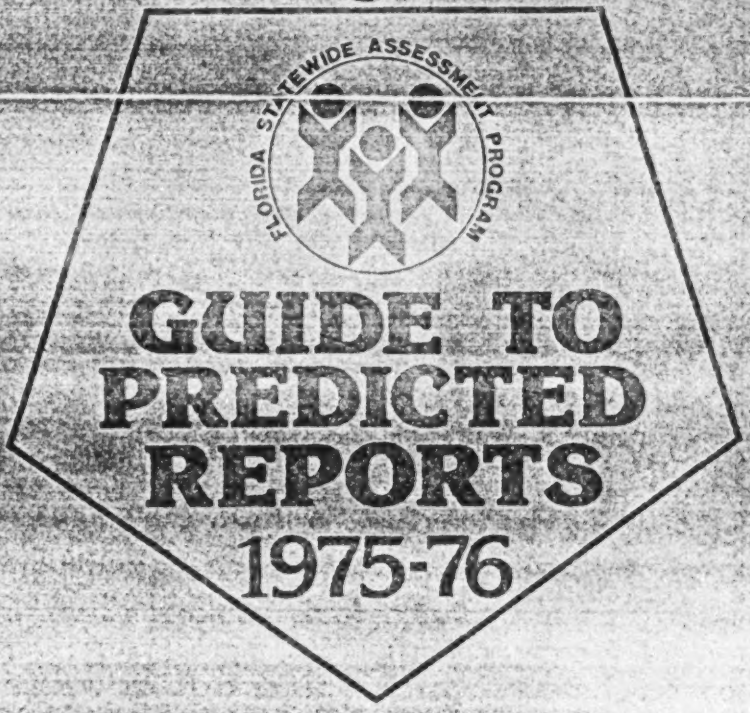

GUIDE TO PREDICTED REPORTS 1975-76

TM006 435

Requests for further information should be sent either to your district coordinator of accountability or to:

Student Assessment Section
Department of Education
Tallahassee, Florida 32304

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Student Assessment Section
Bureau of Program Support Services
Division of Public Schools
Department of Education

December, 1976

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PREFACE

The Statewide Assessment Program of the Department of Education has been involved in a major effort to develop adequate strategies for releasing and publishing assessment scores for schools. One dimension of this effort has been the development of predicted or "adjusted" scores. These scores compare a school to other similar schools rather than simply to the state average.

Using complex statistical techniques, the Statewide Assessment Program developed and released predicted test scores for each school which participated in the 1974-75 assessment of communication skills and mathematics in grades 3, 6, and 9. The predicted scores were based on several factors (primarily socio-economic) which are related to achievement. This document is a guide to the predicted scores calculated from the 1975-76 assessment of communication skills and mathematics in grades 3 and 6.

The Department believes that the predicted score will be a valuable reporting and interpretation tool for examining school achievement on statewide assessment. Your comments and reactions will be appreciated.

Background

Since 1971-72, the Statewide Assessment Program has measured student achievement in the basic skill areas of reading, writing, and mathematics. Yearly, the results have indicated to districts and schools what percentage of their students have achieved each of the state's priority objectives. These results have provided valuable information on specific strengths and weaknesses of the curriculum.

However, the specificity and quantity of data--the two factors most crucial to identifying curriculum strengths and weaknesses--are difficult for the citizen, parent or legislator to understand. These audiences prefer a reporting system which summarizes the data.

In devising a simplified method of reporting, the Statewide Assessment Program attempted to avoid one drawback of common reporting methods: failure to consider the effect of outside or non-school factors on test scores. Many studies have documented the fact that test scores are influenced by non-school factors such as student socio-economic status. Therefore, one should look not only at the final test score but also at how the non-school factors influenced that score.

Consequently, in 1973 the Statewide Assessment Program began to develop a new method of reporting school scores. The method was first used to report the results for each school which participated in the 1974-75 assessment of communication skills and mathematics in grades 3, 6, and 9. It is an attempt to "predict" (adjust) a school's score by considering the socio-economic characteristics of the students in the school. Although some complex statistical techniques are involved, it is basically a procedure for accounting mathematically for the influence of the outside factors.

The purpose of the predicted score is to provide a standard of comparison other than the state mean. Therefore, the school's actual performance is compared to its predicted performance level. The predicted score is based on the general performance trends of all schools with similar non-school factors.

It is important to stress the fact that if an observed score is higher than the predicted score the situation is not necessarily "desirable". Both scores could be far lower than is desired. It is still the responsibility of every Florida school to help all of its students acquire the basic skills specified in the statewide objectives. This is the purpose of the objective-referenced testing and reporting conducted by the state.

Developing the School Predicted Score

The school predicted score is based on available data which correlates highly with school test scores. A correlation means that two things occur together often enough across an entire population to allow an estimation of one if the other is known. For example, it is known that a relationship exists between men's height and weight. The correlation is not one hundred percent correct (there are tall, thin men), but it is stable enough to permit a fairly accurate estimate of weight if the man's height is known.

Note that correlation does not necessarily mean causation. If things are related, it means only that they tend to occur together. In the example of weight and height, a high correlation does not say that one causes the other. Causation may be present, but a correlation analysis by itself will not confirm it.

The accuracy of the estimate or prediction can be improved by considering additional related factors. For example, knowing whether the person had a thin frame or stocky build would help predict his weight more accurately.

Predictor Factors

In trying to find the best possible predictors, the Assessment Program investigated many different *factors* (also referred to as *predictor variables*) which were available on Department of Education data files. From these variables, the ones which did the best job of predicting school test scores were used to calculate the predicted ranges. The five variables are:

1. Spanish native language, based on data gridded onto each student's booklet or answer sheet for the 1975-76 statewide assessment;
2. Family income, based on the percent of students receiving free/reduced lunch, from data in the 1975-76 Quantitative Report (ACC-1);
3. White collar occupation, from the principal's estimate in the 1975-76 Quantitative Report (ACC-1);
4. College education, based upon a 1975-76 survey asking principals to estimate the percentage of students from families where either parent had at least some college education; and

5. Minority enrollment, excluding white and Spanish, based upon data collected in the 1975-76 Civil Rights Survey.

These same five variables were used in the calculation of the 1974-75 school predicted scores. (However, in 1974-75 family income was based on the principal's estimate of the percentage of students with income under $3,000, instead of the percentage receiving free or reduced lunch.)

Before the predictor variables were used in the prediction formulas, each district coordinator of accountability received a printout showing the values for each of these five variables for each school. Coordinators were asked to verify that the values were those originally supplied by the schools. Only after this verification were the 1975-76 predicted scores calculated.

Calculating 1975-76 Scores

The school test score, labeled in the 1975-76 reports either as the SCHOOL SCORE or as the OBSERVED SCORE, is based on the average number of test items answered correctly for each subject area (mathematics and communication skills) and for the total test. This average was converted to a normal distribution in which the state score is 50 for each subject area and the standard deviation is 10.

The purpose of the transformation is to aid interpretation of scores for the various subjects and grades, since different numbers of items were used to measure each. Without transformation, a score of 57 in mathematics and a score of 61 in reading are not comparable, as they represent 57 of 71 items versus 61 out of 102 items.

Because of the transformation, the following kinds of comparisons can be made:

1. If the school score is higher than the state score of 50, the school is performing above the state average in that area; if it is lower than 50, the school is achieving below the state average.

2. If the school score is higher in mathematics than in communication skills, the school is performing relatively better in mathematics. Likewise, if the score for third grade mathematics is higher than for sixth grade

mathematics, it means that third graders performed relatively better on the assessment than did sixth graders.

School observed scores range from a high of about 81 to a low of about 16. Because of the normalization process used, about 67% of the schools in the state have scores between 40 and 60, and 95% have scores between 30 and 70. As a result, a school's 1975-76 observed score will be higher than its 1974-75 score only if it changed its relative position in comparison to the state average. Even if all schools in the state had improved in achievement of basic skills from 1974-75 to 1975-76, not all schools would have higher scores. The only schools which would have higher scores would be those which improved more than the average amount of improvement statewide.

The predicted score for the school is found by comparing the school and its characteristics (predictor values) to the state averages. The basic assumption is that a school with characteristics like the state's would be expected to score at the state average and that, as a school's characteristics differ from the state's, its test scores will change correspondingly. For example, if a school has families with high income and educational levels, we would "expect" that its test scores would be relatively high. On the other hand, if the school's income level is lower than the state average, we would expect that test scores would be lower.

The amount by which scores will be higher or lower in each case has been determined by a statistical technique known as multiple regression. The details of the multiple regression technique will not be given here. For further information, contact your district coordinator or write to the Student Assessment Section, Department of Education, Tallahassee, Florida 32304.

Reporting Predicted Scores

Since the predictions are based on correlations between sets of data which are not in themselves perfectly accurate (as in the principals' estimates of white collar occupation and educational level), the predictions cannot be precise or exact. Therefore, each prediction takes the form of a predicted range with a predicted minimum and maximum score. This range is based on a confidence

level of .05, which means that there is a 95% probability that the school's true predicted score is within the range.

If the school's test score is within the predicted range (which includes equaling the minimum or the maximum), the school is performing as expected. For example, if the school's score for mathematics is 55 and its predicted range is 41 to 64, the school is within its predicted range. Most schools in the state are performing "as expected".

If the school's test score is higher than the predicted maximum, the school is performing better than predicted and can be considered a *positive outlier*. If the school's test score is lower than the predicted minimum, the school is performing lower than predicted and can be considered a *negative outlier*. For example, for a predicted range of 41 to 63 for mathematics, a score of 68 would be higher than the predicted maximum, and the school would be considered a positive outlier in mathematics. On the other hand, if the range is 41 to 63 and the school's score is 31, the school would be considered a negative outlier.

An outlier school is one whose overall student achievement of the basic skills measured in the 1975-76 assessment was either significantly higher or lower than expected. Because of statistical errors inherent in the process, it is only possible to say that an outlier school is highly likely to be "unusual" in some way. The Department will conduct further studies of the outlier schools to see if it is possible to identify any instructional techniques which are causing good student achievement. If so, these techniques can be disseminated to other schools.

Reading the School Report

The school report, called the 1975-76 PREDICTED/OBSERVED GRAPH (see the example on page 8), contains scores for mathematics, communication skills, and the total test. The school score, also called the OBSERVED SCORE, is the average number of items answered correctly in the school, transformed to a distribution with a state mean of 50 and a standard deviation of 10.

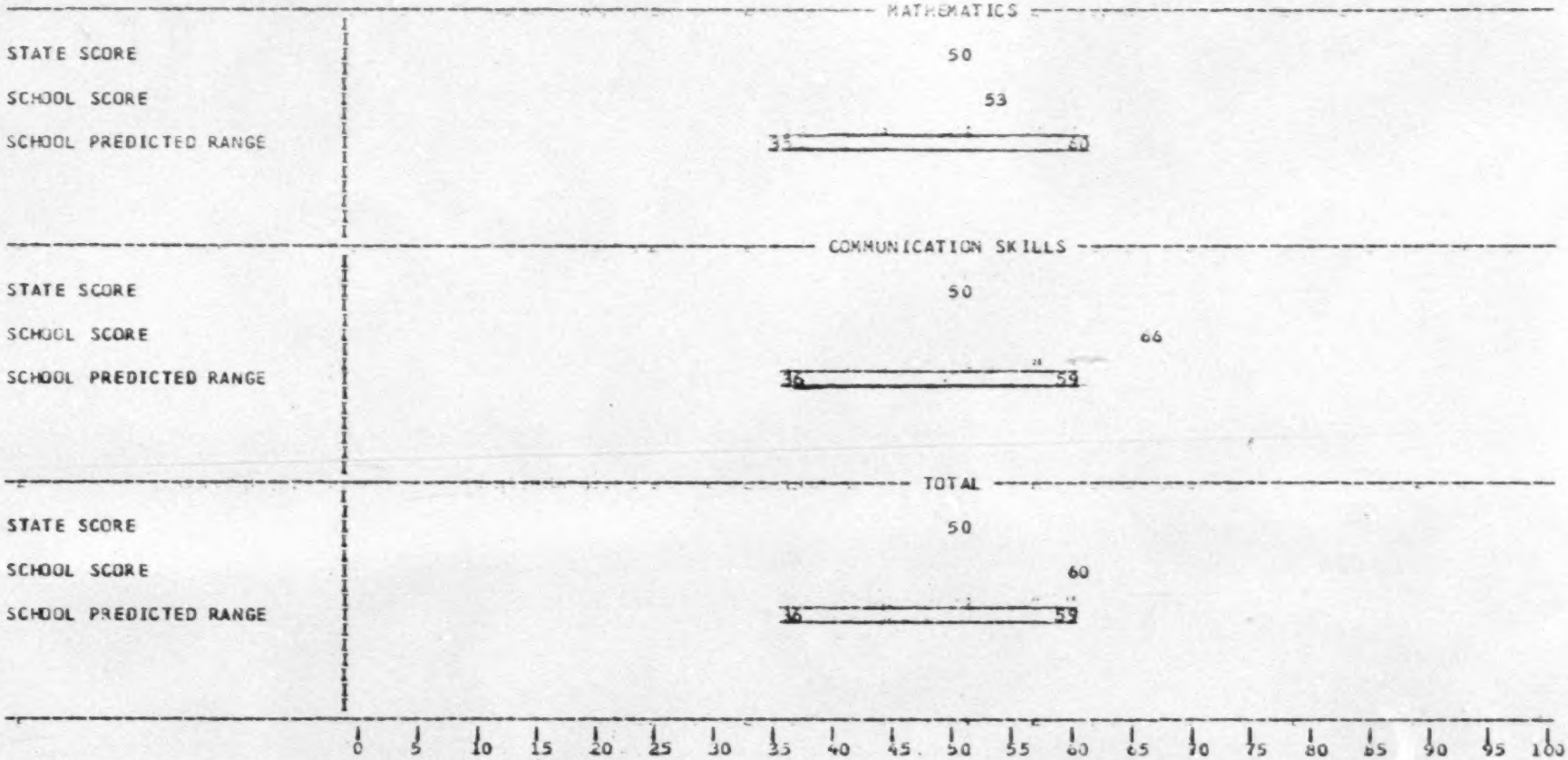
There is a separate PREDICTED/OBSERVED GRAPH (see the example) for each grade assessed in the school. The grade and number of students tested are identified in the right corner.

DISTRICT 73 RAINY DAY

SCHOOL 111 PUDDLEVILLE ELEMENTARY

FLORIDA DEPARTMENT OF EDUCATION
STATEWIDE ASSESSMENT PROGRAM
1975-76 PREDICTED/OBSERVED GRAPH

POPULATION 113
SIXTH GRADE



THE SCHOOL'S PREDICTED RANGES WERE CALCULATED USING THE PERCENTAGES SHOWN FOR THE FOLLOWING FIVE FACTORS. THESE FIVE NON-SCHOOL FACTORS HAVE CONSISTENTLY BEEN RELATED TO STUDENT TEST PERFORMANCE. NO CAUSAL RELATIONSHIP BETWEEN THESE FACTORS AND SCHOOL PERFORMANCE SHOULD BE ASSUMED.

	SCHOOL	DISTRICT	STATE	SOURCE
SPANISH NATIVE LANGUAGE	01	01	02	75-76 ASSESSMENT DATA
FAMILY INCOME	38	45	37	75-76 QUANTITATIVE DATA SURVEY
WHITE COLLAR OCCUPATION	25	25	28	75-76 QUANTITATIVE DATA SURVEY
COLLEGE EDUCATION	14	13	21	75-76 PRINCIPALS' QUESTIONNAIRE
MINORITY	20	17	22	75-76 CIVIL RIGHTS SURVEY

The report presents two kinds of information: (1) in the top part, the observed and predicted scores for mathematics, communication skills, and total test; and (2) at the bottom, information on the five factors used to calculate the predicted scores.

In the section on observed and predicted scores, the subject area is identified in the center of the page. Directly below the subject area is the STATE SCORE for the subject, which is always 50.

The SCHOOL SCORE for the subject area is located immediately below the state score. If the school score is to the left of the state score, the school scored below the state average. If the school score is to the right, the school scored above the state average for the subject area.

The SCHOOL PREDICTED RANGE is represented by two scores--the predicted minimum and predicted maximum--which are connected by dotted lines. If the school score is within the boundaries defined by the dotted lines, the school is performing as predicted. If the school score is to the right of the predicted maximum, achievement was better than predicted. If the school score is to the left of the predicted minimum, achievement was lower than expected.

The bottom section of the report provides information on the five non-school variables used to calculate the predicted scores. The listing provides the percentage of students in the school, the district and the state for each factor. The percentage of students with Spanish native language is given by grade; the other factors are based upon the percentage of students in the school with the characteristic. The source of the data is listed in the right column.

Thus, in the example, Puddleville Elementary had an observed school score of 53 in mathematics, which is slightly above the state score of 50 and within the school's predicted range of 35 to 60. Therefore, Puddleville is performing as predicted in mathematics. The school's score of 66 in communication skills is substantially above the state score of 50 and is also above the predicted range of 36 to 59. Thus, Puddleville is a positive outlier for communication skills and is also a positive outlier on total test, since its score of 60 is above the predicted range of 36-59.

FILE NO. 07.167

DISTRICT 73 RAINY DAY

FLORIDA DEPARTMENT OF EDUCATION
STATEWIDE ASSESSMENT PROGRAM
1975-76 PREDICTED/OBSERVED LISTING

THIRD GRADE

SCHOOL	MATHEMATICS			COMM SKILLS			TOTAL		
	PREDICTED MINIMUM	PREDICTED MAXIMUM	OBSERVED SCORE	PREDICTED MINIMUM	PREDICTED MAXIMUM	OBSERVED SCORE	PREDICTED MINIMUM	PREDICTED MAXIMUM	OBSERVED SCORE
1111 PUDDLEVILLE ELEMENTARY	34	61	44	35	61	41	35	61	41
2222 CLOUDBURST ELEMENTARY	34	60	39	34	60	38	34	60	38
3333 RAINBOW ELEMENTARY	31	57	47	31	57	44	31	57	45
4444 CLOUDY SKIES ELEMENTARY	38	65	44	38	65	49	39	64	46
5555 RAIN DROPS ELEMENTARY	35	62	55	36	62	48	36	61	50
DISTRICT AVERAGE	34	61	43	34	60	41	34	60	42

At the bottom of the report are the values of the predictor variables which were the basis for the predicted scores. They show that for sixth grade 1% of the students in the school have Spanish as their native language. Thirty-eight percent of the students are considered low income (free/reduced lunch), 25% come from families employed in white collar occupation, 14% come from families with some college education, and 20% are minority students.

District Scores

District scores have been calculated as part of the 1975-76 predicted score process. These district scores are weighted averages, based on the population of each school. They are printed on the 1975-76 PREDICTED/OBSERVED LISTING (example, page 10).

Cautions in Interpreting Predicted Scores

There are a number of special limitations which apply to the interpretation of the 1975-76 predicted scores. First, the results are based only on student achievement of basic skills in reading, writing, and mathematics. Conclusions about school effectiveness should be limited to these subject areas, rather than to the entire curriculum.

Second, the scores are obtained through a process which forced a non-normal distribution into a normal shape. Because Statewide Assessment is a measure of minimal skills, it does not discriminate well among the top students, and large percentages of them achieve high scores on the test. This mastery curve is appropriate for an objective-referenced test of basic skills. However, forcing the schools' averages into a normal distribution implies more separation between the top schools than actually exists.

Third, the predictor variables are based on estimates, so the exact status of any one school may be in error. However, the amount of error is not large enough to move a school from the positive outlier area to the negative outlier category, or vice versa.

Fourth, the identification of a school as a positive or negative outlier is not a sure selection of the most or least effective schools in the state. Much further information must be gathered through on-site visitations to determine whether or not the initial classification of the school was justified.

Using the Predicted Scores in Reports

Good dissemination practices include release of summary test results to various audiences such as parents, the school board, and the news media. The school observed and predicted range scores provide simplified data which can be used for this purpose. The data can be reported either in narrative format or in a combination of narrative and tables.

EXAMPLE 1.--NARRATIVE

During 1975-76, all students in grades 3 and 6 were assessed on statewide objectives in reading, writing, and mathematics. The results indicate that.... (mention key strengths and weaknesses from the local district analysis of performance on each objective).

The complete scores are available in the school office, but, in summary, they show that...

1. *Third grade math: The school score of 50 is above its predicted range of 11 to 45 and the same as the state score of 50. This means our school is performing better than other similar schools.*
2. *Third grade communication skills: The school score of 40 is within its predicted range of 17 to 44, but slightly below the state score of 50. Therefore, the school is performing as well as other similar schools, but its average is less than the state average.*

EXAMPLE 2.--TABLE

Use the same lead-in paragraph as in example 1. Use a table similar to the one below:

	STATE SCORE	*SCHOOL SCORE*	*SCHOOL PREDICTED RANGE*	*INTERPRETATION*
3rd gr. Math	*50*	*50*	*16-45*	*School scored above predicted, and same as state.*
3rd gr. Comm.	*50*	*40*	*17-44*	*School scored as predicted, but below state average.*
3rd gr. Total	*50*	*43*	*17-44*	*School scored as predicted, but below state average.*